

SUPPORT FOR THE AMENDMENT

Support for the amendment to Claim 1 is found in original Claims 8 and 12.

Claim 3 is amended to correct an obvious typographical error.

Claims 9-11, 13-14 and 26 are amended to depend from Claim 1.

Claim 5 was previously canceled, Claims 8, 12, 16, 17, 22, 24 and 25 are herein canceled.

Support for the amendment to Claim 19 is found in original Claim 22.

No new matter will be added to this application by entry of this amendment.

Upon entry of this amendment, Claims 1-4, 6-7, 9-11, 13-15, 18-21, 23 and 26 are active. Claims 18-21 and 23 are withdrawn.

REQUEST FOR RECONSIDERATION

The claimed invention is directed to a saponified ethylene-vinyl acetate resin composition having significantly improved melt extrusion stability, surface smoothness, interlayer adhesiveness and gas-barrier properties.

Saponified ethylene-vinyl acetate resins are melt processed into films, sheets, pipes, tubes and bottles. Such products are useful as packaging materials for food and other products where good gas barrier performance is required. Manufacture of these products involves a melt extrusion procedure and when conventional saponified ethylene-vinyl acetate resin compositions are used, the products formed often exhibit a surface defect streak running in the extrusion processing direction of the product. In addition, products prepared by melt-extrusion of saponified ethylene-vinyl acetate resin may suffer from fluctuations in product thickness, reduction in width or thickness of the extruded material and when co-extruded with other thermoplastic products, poor interlayer adhesion.

The claimed invention addresses these problems by providing a resin composition, comprising: a saponified ethylene-vinyl acetate resin and from 0.1 to 3000 ppm, based on the total amount of the saponified ethylene-vinyl acetate resin, of a compound having a molecular weight of at most 1000 and having at least one conjugated double bond, from 10 to 5000 ppm of at least one second compound selected from the group consisting of higher fatty acid amides and fatty acid salts, expressed as the ppm of free fatty acid relative to the total amount of the saponified ethylene-vinyl acetate resin, and from 10 to 5000 ppm, of a boron compound, expressed as the ppm of elemental boron in said boron compound relative to the total amount of the saponified ethylene-vinyl acetate resin, wherein the saponified ethylene vinyl acetate resin has a methoxy group content ranging from 0.0005 to 1 mol % based on the total moles of monomer units in the resin, an ethylene content ranging from 5 to 60 mol % based on the total moles of monomer units in the resin, and a degree of saponification of at least 85 mol % based on the number of moles of vinyl acetate monomer units in the resin. Such a resin composition is neither disclosed nor suggested by the cited references.

Applicants respectfully note that Claim 1 is herein amended to include in the description of the resin composition, the following: “from 10 to 5000 ppm of at least one second compound selected from the group consisting of higher fatty acid amides and fatty acid salts, expressed as the ppm of free fatty acid relative to the total amount of the saponified ethylene-vinyl acetate resin, and from 10 to 5000 ppm, of a boron compound, expressed as the ppm of elemental boron in said boron compound relative to the total amount of the saponified ethylene-vinyl acetate resin, . . .”

The rejection of Claims 1-4, 6, 7, 15 and 26 under 35 U.S.C. 103(a) over Satoh et al. (U.S. 4,485,225), Jenkins et al. (U.S. 4,649,186) or JP 62128754, each independently in view of Moritani et al. (U.S. 5,744,547) is respectfully traversed.

The cited primary references, each independently in combination with Moritani do not disclose or suggest a resin composition, comprising: a saponified ethylene-vinyl acetate resin and from 0.1 to 3000 ppm, based on the total amount of the saponified ethylene-vinyl acetate resin, of a compound having a molecular weight of at most 1000 and having at least one conjugated double bond, from 10 to 5000 ppm of at least one second compound selected from the group consisting of higher fatty acid amides and fatty acid salts, expressed as the ppm of free fatty acid relative to the total amount of the saponified ethylene-vinyl acetate resin, and from 10 to 5000 ppm, of a boron compound, expressed as the ppm of elemental boron in said boron compound relative to the total amount of the saponified ethylene-vinyl acetate resin, wherein the saponified ethylene vinyl acetate resin has a methoxy group content ranging from 0.0005 to 1 mol % based on the total moles of monomer units in the resin, an ethylene content ranging from 5 to 60 mol % based on the total moles of monomer units in the resin, and a degree of saponification of at least 85 mol % based on the number of moles of vinyl acetate monomer units in the resin..

Applicants have discussed the descriptions of Sato and Jenkins on pages 8-10 of the response filed December 1, 2006. JP 62128754(English abstract) describes a wrapping material comprising a saponified material of ethylene-vinylacetate copolymer modified with a monomer component which is a substituted alkoxy alkyl acrylamide. None of the primary references describe a composition comprising a compound having a molecular weight of at most 1000 and having at least one conjugated double bond, from 10 to 5000 ppm of at least one second compound selected from the group consisting of higher fatty acid amides and fatty acid salts, expressed as the ppm of free fatty acid relative to the total amount of the saponified ethylene-vinyl acetate resin, and from 10 to 5000 ppm, of a boron compound, expressed as the ppm of elemental boron in said boron compound relative to the total amount of the saponified ethylene-vinyl acetate resin,.

Moritani is cited to show a conjugated polyene having a boiling point of at least 20°C. Moritani describes saponified products and compositions of ethylene-vinyl acetate copolymers containing the described conjugated polyene. The products based on the reference composition display little coloring and/or gel-like agglomerates which are formed upon melt molding of conventional compositions of ethylene-vinyl acetate copolymers. Melt molding is described to include extrusion molding, tubular film process, blow molding, melt spinning, injection molding or like processes (Col. 8, lines 25-28). Clearly the problem this reference addresses is melt related not exclusively extrusion related.

The Examiner stated in the Official Action of March 9, 2006, that

“it would be obvious to one of ordinary skill in the art to include sorbic acid in the amounts taught or exemplified by Moritani, in the saponified ethylene/vinyl acetate copolymers taught by Satoh et al., Jenkins et al. or JP 62128754, in order to decrease the coloring and generation of gel-like particles on molding, motivated by a reasonable expectation of success.”

Applicants note that the claimed invention is directed specifically to a saponified ethylene-vinyl acetate resin composition having significantly improved melt extrusion stability, surface smoothness, interlayer adhesiveness and gas-barrier properties. Applicants have described the “streak” problem associated with extruded products on page 1 of the specification. Moritani nowhere discloses or suggests a resin composition to address problems associated with an extrusion such as streaks, melt extrusion stability or drawdown resistance.

Moreover, neither Satoh, Jenkins nor JP 62128754(English abstract) are concerned with or even refer to a problem related to melt extrusion of a resin composition, comprising: a saponified ethylene-vinyl acetate resin. Therefore, Applicants respectfully submit that the cited references neither expressly nor impliedly suggest the claimed invention. There is no motivation to combine the composition of Moritani with the processes of Jenkins or Satoh

nor the wrapping material of JP 62128754 as the problem addressed by each reference is different. Nor do the cited references provide any teaching relative to melt extrusion stability that would suggest combining the references to arrive at the claimed invention.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so. (*In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006))

Applicants have demonstrated significant improvement in physical properties of the extruded product obtained from the composition of the claimed invention in the Examples and specifically in the test data of Table 2. Significant improvement in surface smoothness, melt extrusion stability, drawdown resistance, interlayer adhesiveness and oxygen transmission rate for the claimed composition is indicated by the data.

The test data of Table 2 clearly shows that the claimed invention provides significant improvement in surface smoothness, melt extrusion stability and drawdown resistance in comparison to example compositions which do not meet the defined parameters of the invention composition. Such improvement is not disclosed or suggested by the cited references in any combination as none of the references even address or recognize the problems described for a melt extrusion process. Applicants respectfully submit that as none of the cited references provide teaching or suggestion of any kind relative to surface smoothness, melt extrusion stability and drawdown resistance of a product formed by a melt extrusion procedure, there can be no motivation for one skilled in the art to combine these references to arrive at the claimed invention. Moreover, there is no basis to expect the significant improvement achieved by the claimed invention.

Based on the logic and arguments presented above, Applicants respectfully request that the rejection of Claims 1-4, 6, 7, 15 and 26 under 35 U.S.C. 103(a) over Satoh et al., Jenkins et al. or JP 62128754, each independently in view of Moritani et al. be withdrawn.

The rejection of Claims 1-4, 6, 7, 15 and 26 under 35 U.S.C. 103(a) over Moritani et al. in view of Satoh et al. is respectfully traversed.

As discussed above neither of the cited references discloses or suggests the presently claimed composition or addresses the specific problems associated with a melt extrusion procedure. Moreover, there is no suggestion or motivation provided that the combination of the references would achieve any improvement, let alone the degree of improvement indicated by the data in Table 2. Applicants respectfully submit that as the references provide no teaching, suggestion, or motivation to combine or modify their teachings toward the claimed invention, obviousness cannot be established by the combination of Moritani et al. and Satoh et al. (*In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006). Therefore, withdrawal of the rejection of Claims 1-4, 6, 7, 15 and 26 under 35 U.S.C. 103(a) over Moritani et al. in view of Satoh et al. is respectfully requested.

The rejections of (A) Claims 8-11 and 16 and (B) Claims 12-14 and 17 under 35 U.S.C. 103(a) over Satoh et al. (U.S. 4,485,225), Jenkins et al. (U.S. 4,649,186) or JP 62128754, each independently in view of Moritani et al. (U.S. 5,744,547) and further in view of (A) Ninomiya (U.S. 6,383,583), Akao (U.S. 4,871,613) or Akao et al. (U.S. 5,110,643 or 5,804,020) and (B) any single one of Iwanami et al. (JP 55012108) or Oozeki et al. (JP 57034148) respectively, are respectfully traversed.

None of the cited reference combinations disclose or suggest the claimed invention.

Ninomiya, Akao and Akao et al. are cited to show the presence of a fatty compound, i.e., ethylenebistearamide in ethylene and ethylene copolymer resins. Iwanami et al. and Oozeki et al. are cited to show the presence of a boron compound in a resin composition. However, Applicants respectfully submit that none of these references cures the basic deficiency of the primary references as described above and neither anticipate nor render obvious the claimed invention. Therefore, Applicants respectfully request that the rejections

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of (A) Claims 8-11 and 16 and (B) Claims 12-14 and 17 under 35 U.S.C. 103(a) over Satoh et al., Jenkins et al. or JP 62128754, each independently in view of Moritani et al. and further in view of (A) Ninomiya, Akao or Akao et al. and (B) any single one of Iwanami et al. or Oozeki et al. respectively, be withdrawn.

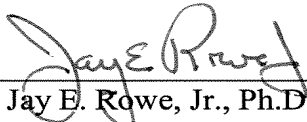
Applicants note the Examiner's indication that "A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01."

Applicants respectfully do not understand the justification for this requirement. No claims have yet been identified as allowed as described in MPEP § 821.01. Furthermore, as Claims 18-25 depend from the elected claims, they may be considered for rejoinder under MPEP § 821.04(a) once allowable claims are identified.

Applicants respectfully submit that the above-identified application is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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